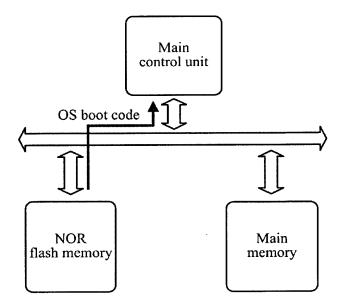Jaemin LIM, et al.   Q76050
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Fig. 1a

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Fig. 1b

Main control unit

3. OS Loading

Main memory

1. Boot loader

2. OS image
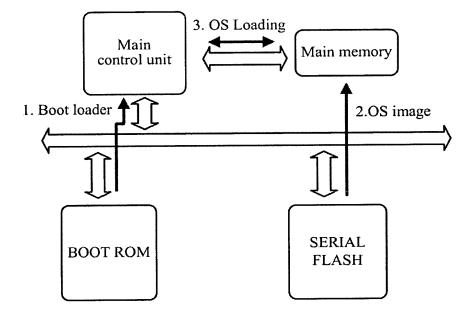
BOOT ROM

SERIAL FLASH

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Fig. 2

Boot area	Operating system area	Data area	File system area
101	103	105	107

SERIAL FLASH   100

Flash memory controller   500

Main control unit   300

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Fig.3

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Fig. 4

| Cache Line #1 (512B) |
| Cache Line #1 (512B) |
| |
| ⋮ |

Cache memory

| Cache Line #0 (512B) |
| Cache Line #1 (512B) |
| ⋮ |
| Cache Line #n (512B) |
| Cache Line #n+1 (512B) |
| ⋮ |

Flash memory

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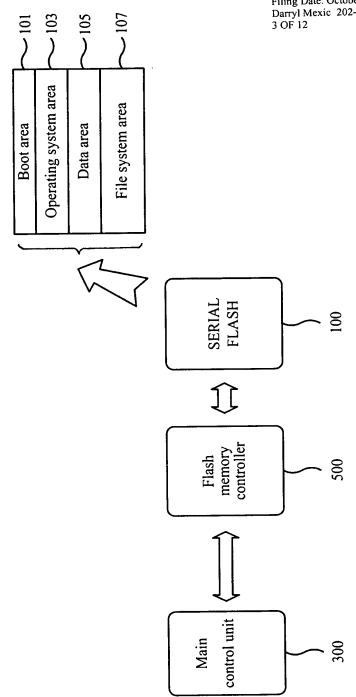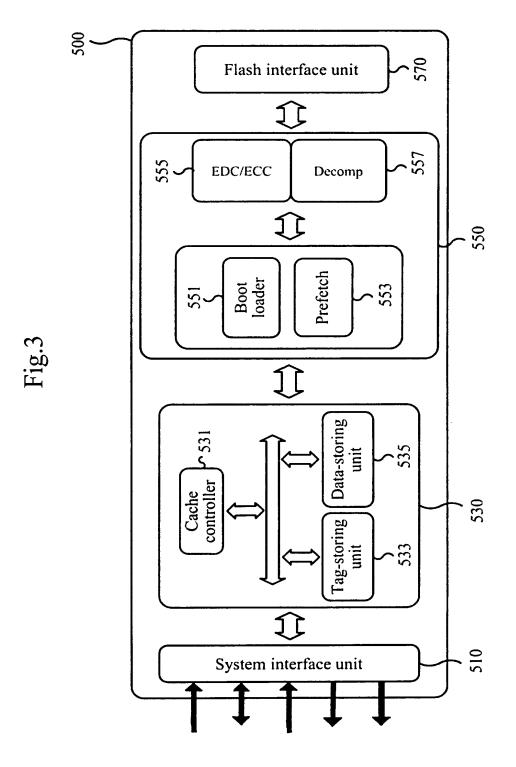6 OF 12

Fig. 5

```
                    ( Start )
                        |
                        v
        +-------------------------------+
        |         Supply power          |~ S1
        +-------------------------------+
                        |
                        v
        +-------------------------------+
        |  Read codes for initial booting|~ S2
        |    and store them in buffer    |
        +-------------------------------+
                        |
                        v
                  /------------\
                 / Are codes    \    No
                <  completely stored >-------->
                 \      ?       /
                  \------------/ ~ S3
                        | Yes
                        v
                  /------------\
                 / Is command received \   No
                <  from                 >-------->
                 \ main control unit?   /
                  \------------/ ~ S4
                        | Yes
                        v
        +-------------------------------+
        |    Process received command    |~ S5
        +-------------------------------+
                        |
                        v
                    ( End )
```

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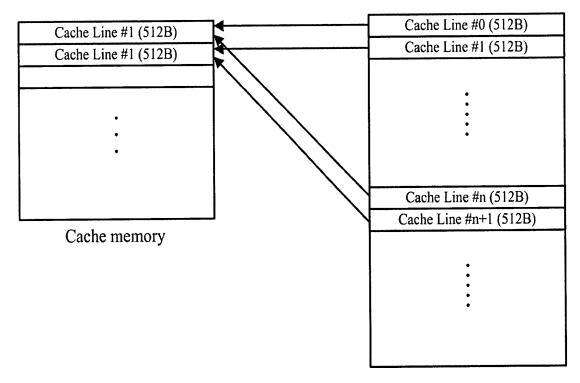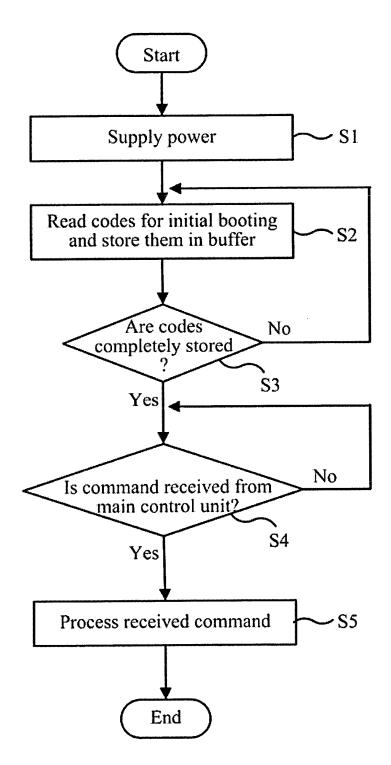Darryl Mexic 202-293-7060
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Fig. 6

```
        ( Start )
            │
            ▼
┌─────────────────────────────┐
│ Receive boot code read command │  ～ S11
└─────────────────────────────┘
            │
            ▼
┌─────────────────────────────┐
│  Extract boot codes from buffer │  ～ S12
└─────────────────────────────┘
            │
            ▼
┌──────────────────────────────────┐
│ Transmit boot codes to main control unit │  ～ S13
└──────────────────────────────────┘
            │
            ▼
        ( End )
```
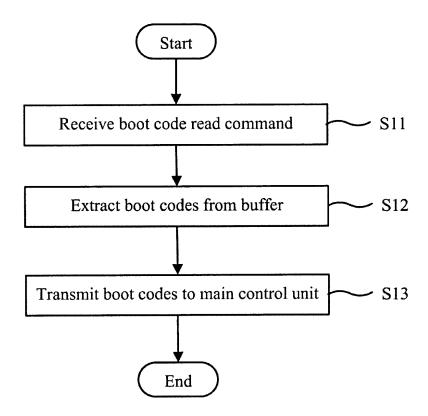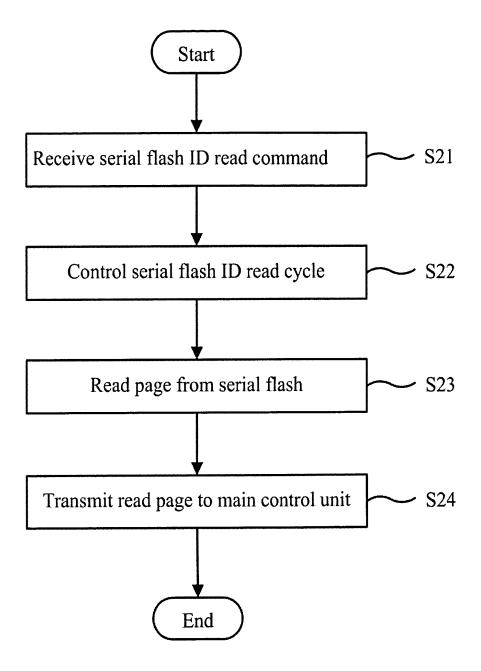
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Fig. 7

```
                    ┌─────────────┐
                    │    Start    │
                    └──────┬──────┘
                           │
                           ▼
        ┌──────────────────────────────────────┐
        │  Receive serial flash ID read command │ ~ S21
        └──────────────────┬───────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────┐
        │      Control serial flash ID read cycle │ ~ S22
        └──────────────────┬───────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────┐
        │        Read page from serial flash    │ ~ S23
        └──────────────────┬───────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────┐
        │  Transmit read page to main control unit │ ~ S24
        └──────────────────┬───────────────────┘
                           │
                           ▼
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```
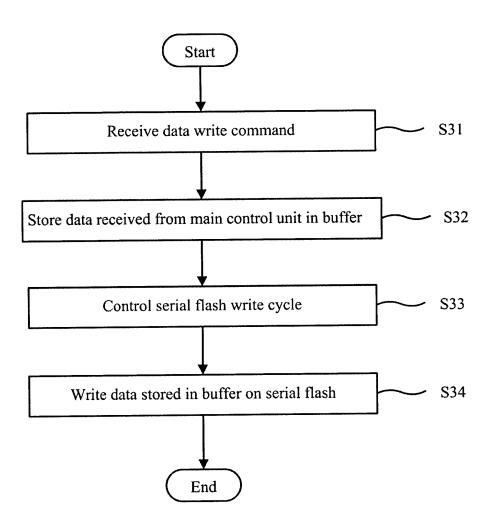
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Fig. 8

```
            ┌─────────┐
            │  Start  │
            └─────────┘
                 │
                 ▼
┌─────────────────────────────────────────┐
│        Receive data write command        │ ──── S31
└─────────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────────┐
│ Store data received from main control unit in buffer │ ──── S32
└─────────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────────┐
│         Control serial flash write cycle         │ ──── S33
└─────────────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────────────┐
│      Write data stored in buffer on serial flash      │ ──── S34
└─────────────────────────────────────────┘
                 │
                 ▼
            ┌─────────┐
            │   End   │
            └─────────┘
```
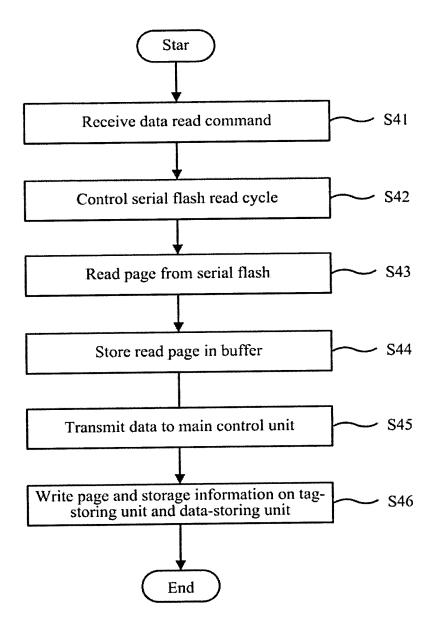
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Fig. 9

```
        ( Star )
           |
           v
+-----------------------------+
| Receive data read command   |  ~ S41
+-----------------------------+
           |
           v
+-----------------------------+
| Control serial flash read cycle |  ~ S42
+-----------------------------+
           |
           v
+-----------------------------+
| Read page from serial flash |  ~ S43
+-----------------------------+
           |
           v
+-----------------------------+
| Store read page in buffer   |  ~ S44
+-----------------------------+
           |
           v
+-----------------------------+
| Transmit data to main control unit |  ~ S45
+-----------------------------+
           |
           v
+-----------------------------------------+
| Write page and storage information on tag- |  ~ S46
| storing unit and data-storing unit         |
+-----------------------------------------+
           |
           v
        ( End )
```

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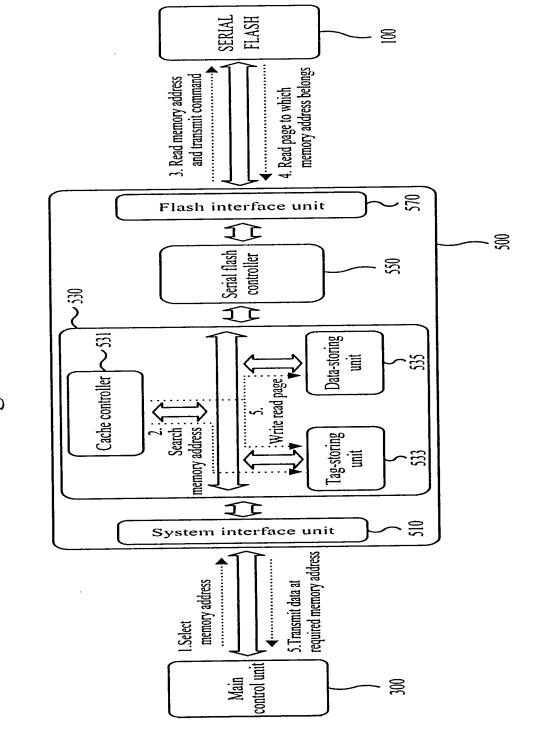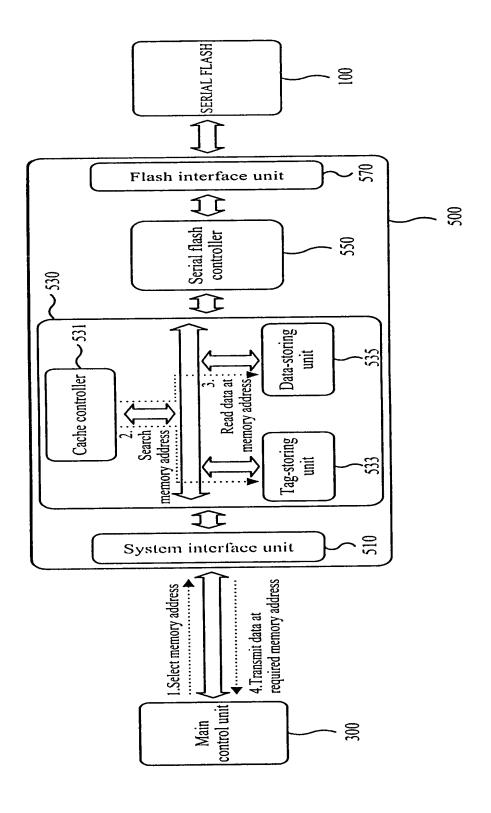Darryl Mexic 202-293-7060
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Fig. 10

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Fig. 11